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# MACARONESIAN PYCNOGONIDA
CANCAP-project. Contribution no. 78

by

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Thirty-two species of Pycnogonida are recorded from the region enclosed by the Azores, Cape Verde Islands and Mauritania, in depths between 0 and 3100 m. Of these, four are new: *Eurycyde diacantha, Achelia tenuipes, Achelia turba, and Nymphon curvidens.* The ranges of nine species are enlarged.

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## INTRODUCTION

Although the pycnogonid fauna of northwestern Africa is relatively well-studied (references in Krapp, 1983 and Sanchez & Munilla, 1987), every new expedition yields some surprising results. This holds likewise true for the various expeditions organized by the Rijksmuseum van Natuurlijke Historie, Leiden, in the period 1976-1988 (CANCAP I to VII and Mauritania Expeditions), in a region extending from the Azores to the Cape Verde Islands (Van der Land, 1987). Most samples come from relatively shallow waters (0-200 m), but several bathyal hauls (down to 3100 m) have also yielded Pycnogonida.

In total, 32 species have been collected, including four new species (*Eurycyde diacantha, Achelia tenuipes, Achelia turba,* and *Nymphon curvidens*). The ranges of nine species are enlarged: *Colossendeis clavata, Nymphon caementarum, N. adami, Callipallene producta, C. tiberi, Anoplodactylus pygmaeus, Endeis meridionalis, E. straughami,* and *Pycnogonum pusillum.*

The fauna of the Macaronesian islands bears in general a great resemblance to that of the Mediterranean/Lusitanian region, as proved by a number of shared species such as *Achelia echinata, A. vulgaris, Callipallene* div. sp., *Anoplodactylus angulatus, A. pygmaeus, A. massiliensis, Endeis charybdaea, Pycnogonum pusillum.* A higher number of endemics, of a tropical, often amphi-Atlantic nature, are found in the Cape Verde Islands; examples of such species are *Eurycyde* div. sp., *Achelia sawayai, A. armata, A. setulosa, Pycnogonum cessaci.* The Mauritanean coast has several peculiarities as well, especially the high number of endemic *Nymphon* species along the coasts of NW Africa is noteworthy (often brought into relationship with the cold upwellings on this coast).

The deepwater species usually have a much greater distribution in the Atlantic or even in all major ocean basins.

The materials are preserved in the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), except for a few samples collected by expedition members of the Amsterdam University that are preserved in the Zoölogisch Museum Amsterdam (ZMA).

## TAXONOMIC PART

### Family **AMMOTHEIDAE** Dohrn, 1881

### **Eurycyde diacantha** spec. nov.
(fig. 1)

Material. — 1 ♂ (holotype). CANCAP-VII Stn. 7.119, Cape Verde Islands, 16°36'N 24°36'W, S. of Razo, coarse calcareous sand, gravel and stones, Foraminifera, grab, 140-160 m 1 Sep. 1986 (ZMA Pa. 3184).

Description. — Male, holotype, body length (frontal margin cephalic segment to tip 4th lateral process) 1.11 mm. Body (fig. 1a) large in relation to thin legs. Ocular tubercle (fig. 1b) with 1 long anterior spine and 1 shorter posterior spine. Eyes pigmented, not in terminal position. Oviger implantation distinctly separated from 1st lateral process. Lateral processes long, unarmed; separated by less than own diameter. Abdomen almost straight, reaching to end of coxa 1 of leg 4; with 2 long spines at some distance from tip, and 2 very short, subdistal spinules (fig. 1c, d).

Proboscis stalked, as usual for the genus.

Chelifore (fig. 1e) with 2-segmented scape; segment 1 longest; both segments very thin and slender; 1 long spine on segment 1, 4 long and 3 shorter

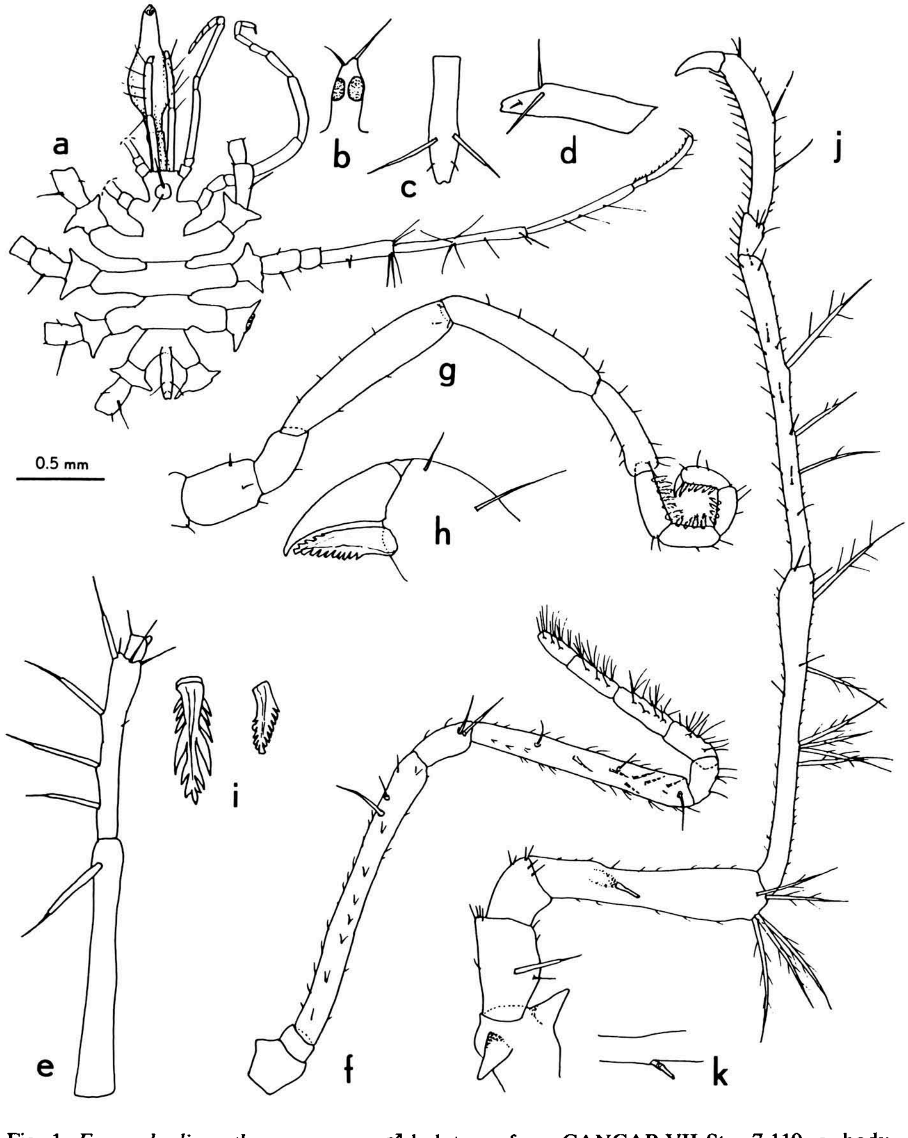



Fig. 1. *Eurycyde diacantha* spec. nov., ♂ holotype, from CANCAP-VII Stn. 7.119. a, body, dorsal; b, ocular tubercle, from the right; c, abdomen, dorsal; d, abdomen, from the right; e, chelifore; f, palp; g, oviger; h, distal part of oviger; i, two types of compound oviger spines; j, third leg; k, cement gland, dorsal. Scale applies to fig. 1a only.

(distal) spines on segment 2. Chela rounded, with knob-like rudiment of finger.

Palp (fig. 1f) 10-segmented, without peculiarities.

Oviger implantation without spiniform process; relative length of segments as usual (fig. 1g). Distal four segments with 2 rows of compound spines, according to formula 6 (7): 4 (5): 4 (4): 5 (5) (rows of smaller spines in parentheses). Compound spines (fig. 1i) of various shapes: with long basal teeth (more abundant on segment 6) or with uniform fine teeth (on segment 10), with various intermediates. Terminal claw (fig. 1h) heavy, smooth; opposing enlarged distal compound spine of segment 10 to form a kind of pseudo-chela.

Coxa 1 (fig. 1j) with 2 heavy, almost triangular, pointed processes. Long spines in middle of coxa 2, at distal end of femur, at central part and end of tibia 1, and at central part of tibia 2; several of these spines with scarce plumosities. Cement gland duct on slight swelling of posterior margin of femur, at ⅓ of femoral lenth. Propodus curved, some 14 spinules of uniform length on sole. Claw short, no auxiliary claws.

Measurements of holotype in µm: Stalk of proboscis 224; distal part of proboscis 753; greatest diameter of proboscis 250; 1st scape segm. 364; 2nd scape segm. 264; width across 2nd lateral processes 749. Third leg: 1st coxa 152; 2nd coxa 217; 3rd coxa 119; femur 483; 1st tibia 665; 2nd tibia 688; tarsus 82; propodus 362; claw 130.

Remarks. — The new taxon belongs to a small group of seven species within *Eurycyde* which are devoid of spiniform processes on the lateral processes. Of these, *E. gorda* Child, 1979 has a crown of spines on the ocular tubercle and lacks long processes on coxa 1. The absence of coxal processes is shared with *E. hispida* (Kröyer, 1844). The remaining species possess strong spurs on coxa 1, like the new species. *E. unispina* Stock, 1986, differs from the new species in having one coxal spur, one large spine on the ocular tubercle, and in the absence of long spines on scape segment 2. The remaining species, *E. encantada* Child & Hedgpeth, 1971, *E. spinosa* Hilton, 1916, *E. longisetosa* Hilton, 1942, and *E. raphiaster* Loman, 1912, all have more long spines (4-8) on the abdomen than the new species.

Etymology. — From the Greek words *di* (= two) and *akantha* (= spine), alluding to the two large spines on ocular tubercle and abdomen, and the two pointed processes on coxa 1.

## **Eurycyde raphiaster** Loman, 1912

Stock, 1975: 959 (refs); 1979: 3; 1986: 409; Child, 1982: 360.

Material. — 1 ♀. CANCAP-VII Stn. 7.036. Cape Verde Islands, SE of Cima, 14°57′N 24°38′W, 30-90 m, sandy bottom, trawl, 24 Aug. 1986 (RMNH). — 1 ♀ CANCAP-VII Stn. 7.059, Cape Verde Islands, SW of Maio, Pta. Inglez/Pta. Preta, 15°07′N 23°14′W, 61 m, calcareous nodules,

dredge, 26 Aug. 1986 (RMNH). — 1 ♂ CANCAP-VII Stn. 7.107, Cape Verde Islands, W of Ilha do Sal, off Palmeira, 16°45'N 23°00'W, 70 m, calcareous nodules, trawl, 30 Aug. 1986 (ZMA).

Remarks. — Was previously recorded from the Cape Verde Islands (Loman, 1912; Fage & Stock, 1966), from Senegal (Fage, 1952), and from various West Indian localities (refs. in Stock, 1986).

### **Ascorhynchus armatus** (Wilson, 1881)

Stock, 1975: 966, fig. 3.

Material. — 1 spm., CANCAP-III Stn. 3.117, off Mauritania, 20°18'N 18°24'W, 2050-2300 m, muddy bottom, trawl, 28 Oct. 1978 (RMNH). — 3 spms. "Tyro" Mauritania-II Expedition Stn. MAU. 105, off Banc d'Arguin, 19°43'N 17°44'W, 1600-1900 m, trawl, 17 June 1988 (RMNH).

Remarks. — This species was already recorded from the same general region (Sénégal, 17°16'N 19°19'W, 1550 m) by Bouvier, 1917, 1937, under the name of *A. agassizi* (see Stock, 1975). The present specimens are morphologically very similar to Bouvier's material. *A armatus* has a wide range in the NW Atlantic.

### **Achelia langi** (Dohrn, 1881)
(fig. 2)

*Ammothea langi* Dohrn, 1881: 146-147, Pl. V figs. 1-8.
*Ammothea (Achelia) langi;* Bouvier, 1923: 55; Loman, 1925: 50.
*Achelia langi;* Fage, 1942: 87; Nogueira, 1967: 324; Stock, 1968: 16, fig. 9; Munilla, 1978: 8, 21; Stock, 1979: 10; Chimenz et al., 1979: 472, 483-484, fig. 4; Taramelli et al., 1981: 537, 547; Munilla, 1981: 80; Lombas & Anadon, 1985: 111; Munilla, 1988: 62; Arnaud, 1988: 39; Sanchez & Munilla, in press.
*Achelia lanzi* (sic); Leung, 1972: 821.

This species is not represented in the present collections. It has been recorded, however, from the littoral zone of Tenerife and La Palma (Canary Islands) by Sanchez & Munilla (in press). From most other members of the large genus *Achelia,* it differs at first sight by the shape of the proboscis, which is more ovate, wider, more massive, and less tapering than in other Macaronesian species, as *A. echinata, A. vulgaris,* or *A. setulosa.*

In Macaronesia exist three other species, sharing with *A. langi* the ovate condition of the proboscis. It is possible that the above-mentioned Canarian records of *A. langi* are based on confusion with one of these three species, most

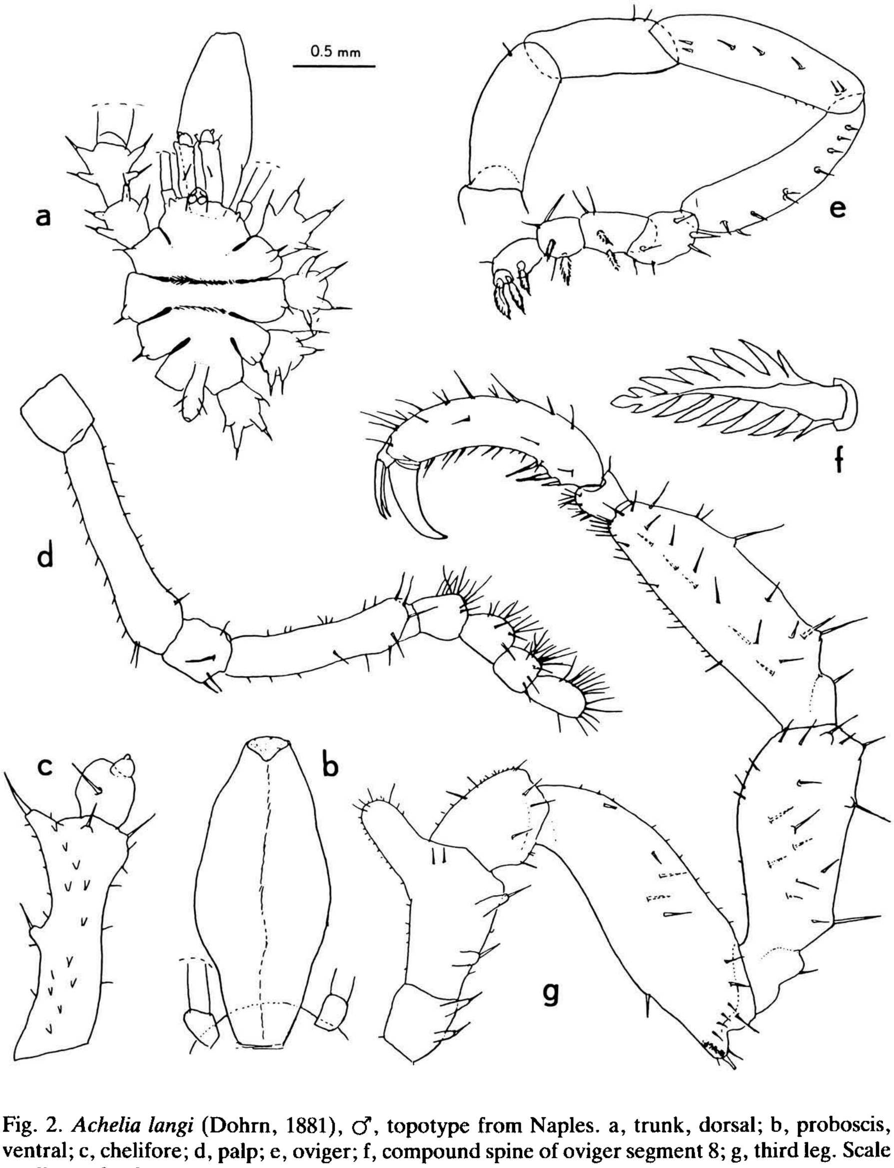



Fig. 2. *Achelia langi* (Dohrn, 1881), ♂, topotype from Naples. a, trunk, dorsal; b, proboscis, ventral; c, chelifore; d, palp; e, oviger; f, compound spine of oviger segment 8; g, third leg. Scale applies to fig. 2a only.

probably with *A. turba*. Therefore, it was thought useful to re-illustrate *A. langi* on the basis of topotypes (from Posilippo, Gulf of Naples, on shallow-water algae, ZMA Pa 1200). Some diagnostic features of *A. langi* are, in addition to proboscis shape, the presence of only one (posterior) process on the

crurigers, the presence of two pairs of processes on coxae 1 and 2, the short distal palp segments, and the absence of strong spiniferous processes on femur and tibiae.

The three species easily confused with *A. langi* are *A. armata* (Bouvier, 1916), *A. turba* n. sp., and *A. tenuipes* n. sp., all discussed in the sequel.

Materials recorded under the name *A. langi* are known from the western Mediterranean, along the Lusitanian coasts of Iberia, Morocco, Guinea, Gambia, and the Canary Islands, always in very shallow waters, sometimes under polluted circumstances. One dubious record from the West Indies.

### **Achelia armata** (Bouvier, 1916)
(fig. 3)

*Ammothea (Achelia) armata* Bouvier, 1916: 81-83.
*Achelia armata*; Bouvier, 1937: 38-42, figs. 11-13.

This species is only known from the holotype, from "Talisman" "no. 112"[1]. Thanks to the courtesy of Dr. J. Forest, I have been enabled to re-examine the holotype, preserved in the Muséum national d'Histoire naturelle, Paris, cat. no. Py 376. It is an ovigerous male, unfortunately in a poor condition: only 3 legs are present, all separated from the body; palp segments 3 to 8 are lacking at both sides; and the proboscis is lacking as well.

Since Bouvier (1916, 1937) described the proboscis as "ovoïde", it is assumed that the proboscis resembles that of *A. langi.* Moreover, Bouvier (1916: 83) compares *A. armata* directly with *A. langi,* and he adds in 1937 that the proboscis of *A. vulgaris* is "bien plus longue et plus effilée".

The morphological peculiarities of the holotype can be summarized as follows: Trunk without segmentation lines. Lateral processes very strongly armed with 1 anterior, spiniferous spur, and a complexly tuberculated ("branched") posterior process (simple only in lateral process 4); this armature is more or less correctly illustrated in Bouvier's (1937) fig. 11. Ocular tubercle as illustrated by Bouvier; eyes present. Scape with 2 distal tubercles, short. Oviger illustrated here for the first time (fig. 3b-c); special spine formula 1 (?): 1: 2: 2; reversed spines on segment 6. Eggs small (diameter 121 μm). Coxa 1 with very strong spurs: 2 anterior and 2 posterior (proximal anterior and proximal posterior spur with typically "pinched" proximobasal part); spurs spiniferous (when spine is absent in holotype, a scar indicates that it has been broken off). Coxa 2 with 2 very strong spiniferous spurs: 2 anterior and 2 posterior; proximal anterior and proximal posterior spurs bifurcate, thus giving the impression of 3 spurs being present on coxa 2. Coxa 3 with small tuber-

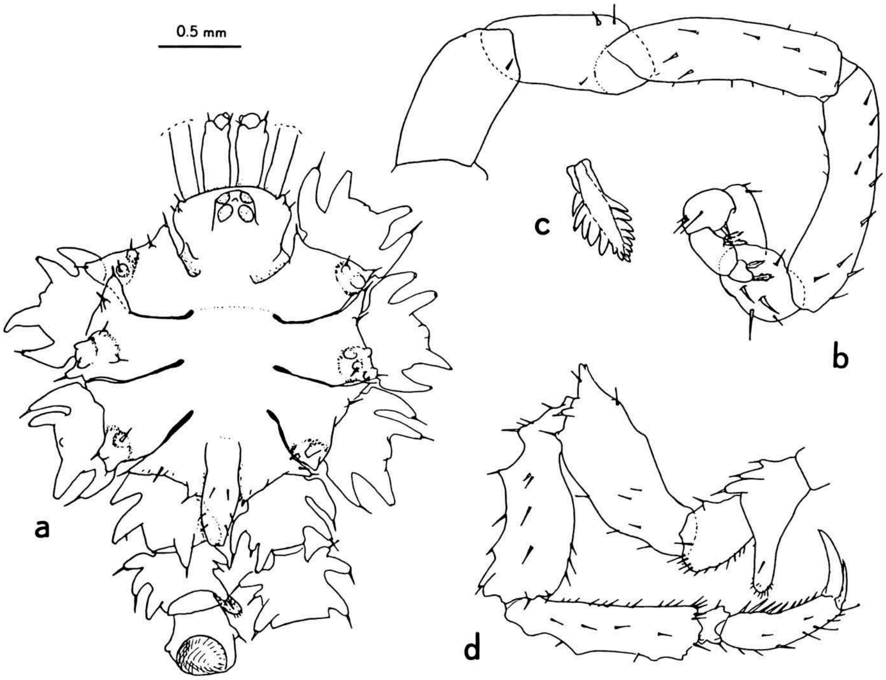



Fig. 3. *Achelia armata* (Bouvier, 1916), ♂, holotype, from "Talisman" no. 112 (Cape Verde Islands). a, trunk, dorsal; b, oviger; c, terminal compound oviger spine; d, third leg. Scale applies to fig. 3a and 3d.

cles only. Femur and tibiae not particularly tuberculated or spinose. Propodus heavy, with 5 stronger basal spines and 4 (?) smaller sole spines. Auxiliary claws about half as long as main claw. Genital spur (on coxa 2) long, finger-shaped, with several spinules. Cement gland cone (distal end of femur) short, overreached by distal femoral process.

[1]There exists some confusion about the exact position of "no. 112". Bouvier (1916: 82) quotes its position as "16°55′ N 27°27′ W (W of Paris!), corresponding with 25°06′46.5" W of Greenwich, 307-405 m, 30 July 1883. Hedgpeth (1948: 309) supposes that "no. 112" corresponds with "Talisman" Stn. 118, 16°51′ N 25°09′ W, 405 m, 30 July 1883. Both positions are in the Cape Verde Islands.

Measurements of holotype (mm). — Length trunk (frontal margin cephalic segment to tip 4th lateral process) 1.75; width across 2nd lateral processes 1.34; length abdomen 0.66; length scape 0.31. Third leg: 1st coxa 0.32; 2nd coxa 0.43; 3rd coxa 0.31; femur 0.96; 1st tibia 1.07; 2nd tibia 1.07; tarsus 0.13; propodus 0.63; claw 0.39; auxiliary claws 0.20.

Remarks. — *A. armata* is distinguished at once from all other Macaronesian members of the genus by the very strong armature of the lateral processes and coxae 1 and 2.

## **Achelia turba** spec. nov.
(fig. 4)

Material. — 1 ♂ (holotype), 10 paratypes. CANCAP-II Stn. 2.K22, Canary Islands, W Coast of Gran Canaria, Puerto de las Nievas, 28°06'N 15°42'W, rocky littoral, rockpools, 16 Sep. 1977 (RMNH). — 18 spms (paratypes). CANCAP-II Stn. 2.K07, Canary Islands, E. coast of Gran Canaria, Puerto de Arinaga, 27°52'N 15°23'W, rocky littoral, pools, 18 Aug. 1977 (14 RMNH, 4 ZMA). — 1 ♂. CANCAP-III Stn. 3.K08, Canary Islands, S. coast of Tenerife, Galletas, 28°00'N 16°41'W, rocky littoral, rockflat with pools, sub-littoral sand, 8 Nov. 1978 (RMNH). — 1 ♀. CANCAP-IV Stn. 4.K09, S. coast of Gran Canaria, Arguineguin, 27°45'N 15°40'W, under stones with Actiniaria (polluted littoral), 6 and 10 May 1980 (RMNH). — 4 ♂♂, 1 ♀. "Tyro" Mauritania-II Expedition Stn. MAU.007, E coast of Cap Blanc, 20°47'N 17°03'W, handcollecting on wreck, about 1 m above LWS, 7 June 1988. (1 ♂ ZMA, remaining specimens RMNH).

The CANCAP samples recorded above, contain an *Achelia* belonging (by the ovoid shape of the proboscis) to the *A. langi* complex. These specimens were at first thought to be *A. armata,* but study of the holotype of the latter (vide supra) shows it to be a different species.

Description. — Male: Trunk ovate; segmentation lines 1 and 2 vaguely visible; frontal margin of neck with 2 tubercles. Lateral processes in contact with each other; each lateral process (except 4th) with 1 anterior and 1 posterior tubercle; each tubercle with small terminal spine. Ocular tubercle rather low, tipped with 2 minute tubercles; eyes pigmented. Abdomen long. Proboscis widest in middle, elongate ovoid in shape.

Chelifore scape with 4 dorsolateral tubercles or spurs; chela reduced.

Palp 8-segmented; segments 6 and 7 bulgy; segment 8 rather slender.

Oviger segments 4 and 5 with small, reversed spines; segm. 6 with 1 large reversed spine. Compound spines slender, with 6 to 8 lateral teeth; formula 2: 2: 1: 2.

Legs rather slender; coxa 1 with 3 anterior spurs and 2 posterodistal spurs; coxa 2 with 3 anterior and 2 or 3 posterior spurs; coxa 3 with 1 dorsal tubercle; femur neither very spinous nor strongly "distorted"; tibiae 1 and 2 slender, with several strong dorsal spines, each spine on a socle or marked tubercle; tibia 1 moreover with some 4 lateral, spiniferous tubercles; tibia 2 with row of lateral spines; propodus slightly curved; 3 heel spines larger than 6 to 8 sole spines. Claw short, auxiliary claws distinctly more than half as long as main claw. Genital spur on coxa 2 of legs 3 and 4, not very long, rounded, armed

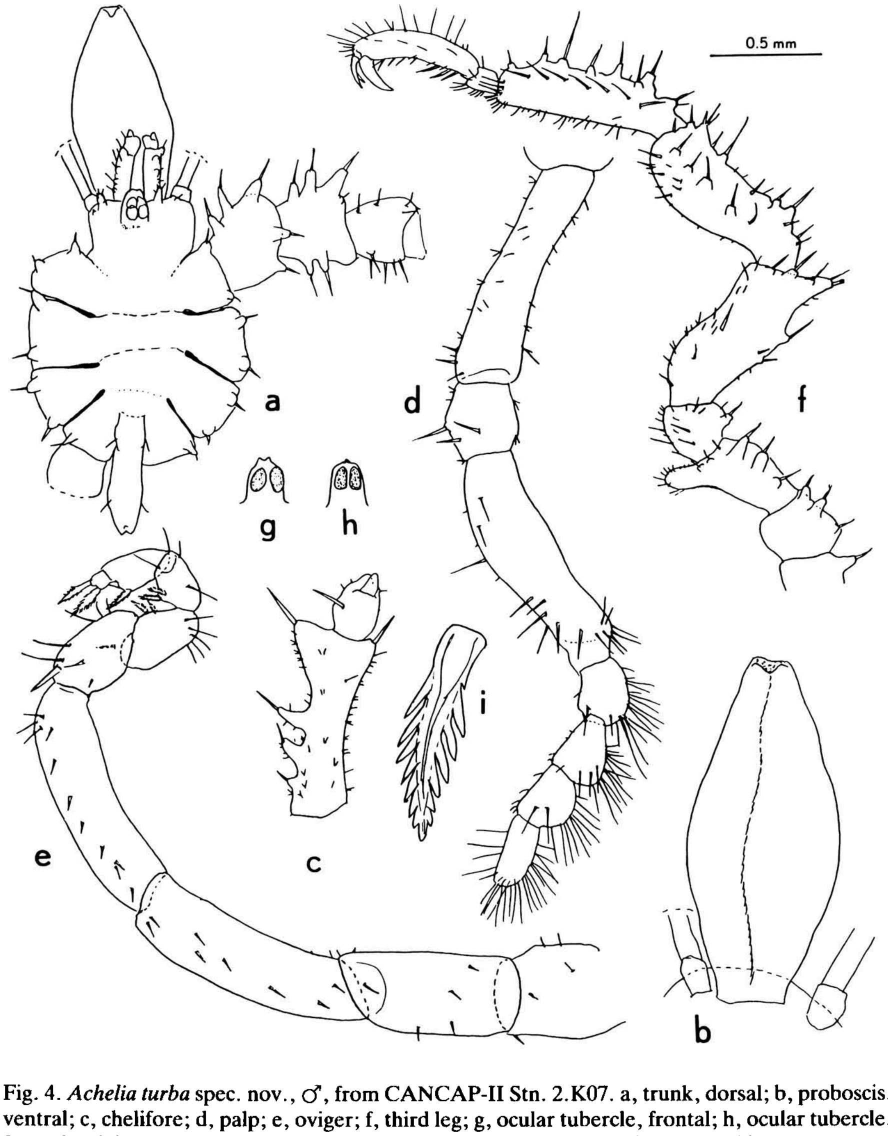



Fig. 4. *Achelia turba* spec. nov., ♂, from CANCAP-II Stn. 2.K07. a, trunk, dorsal; b, proboscis, ventral; c, chelifore; d, palp; e, oviger; f, third leg; g, ocular tubercle, frontal; h, ocular tubercle, from the right; i, terminal compound oviger spine. Scale applies to fig. 3a and 3f.

with several short spinules. Cement gland duct on dorsodistal spur of femur of all legs, with distinct tubular excretion duct.

Female: As usual in the genus *Achelia,* less characteristic (fewer spines, spurs and tubercles).

Remarks. —The numerous spiniferous spurs and tubercles on the scape,

coxae 1 and 2, and tibiae 1 and 2 of the male, distinguishes this species from all others in the *Achelia langi* complex. Characteristic features of *A. turba* (male), differentiating it from *A. langi*, are: ovate proboscis (shorter than in *A. langi*); lateral processes with posterior and anterior spiniferous boss; long abdomen; scape with several dorsolateral spiniferous spurs; coxae 1 and 2 with 3 anterior and 2 or 3 posterior spiniferous spurs; lower spiniferous processes on dorsal and lateral surface of tibia 1, and on dorsal surface of tibia 2; auxiliary claws more than half as long as main claw.

The material from the Canary Islands shows little morphological variation. The specimens from Cape Blanc (Mauritania) are attributed to this species provisionally, because they tend to be slightly less tuberculate than the Canary material.

Measurements of male paratype (mm). — Length trunk (frontal margin cephalic segment to tip 4th lateral process) 1.25; width across 2nd lateral processes 1.09; length proboscis (dorsal) 1.20; greatest diameter proboscis 0.51; length abdomen 0.54; length scape 0.38. Third leg: 1st coxa 0.27; 2nd coxa 0.51; 3rd coxa 0.30; femur 0.81; 1st tibia 0.80; 2nd tibia 0.87; tarsus 0.13; propodus 0.61; claw 0.29; auxiliary claws 0.18.

Etymology. — The specific epithet *turba*, is based on Cicero and means "creating confusion", alluding to the fact that the species can easily be confused with other members of the *A. langi* complex.

## **Achelia tenuipes** spec. nov.
(fig. 5)

Material. — 1 ♂ ovig. (holotype), 1 ♀ (allotype), 9 juvenile paratypes. CANCAP-VII Stn. 7.140, Cape Verde Islands, S. of Razo, 16°35'N 24°36'W, 1200 m, on old lobsterpot with about 500 m of rope; dredge; 4 Sep. 1986 (RMNH).

Description of ♂ holotype. — Trunk almost circular, compact; lateral processes in contact with each other. Lateral processes 1 to 3 with 2 small, spiniferous dorsal tubercles; lateral process 4 only with spinules. Frontal margin of cephalic segment with 2 minute tubercles on each side. Abdomen not very long.

Proboscis ovoid; distal end (with oral aperture) rather wide, giving the proboscis a truncate aspect.

Chelifore scape without salient tubercles or spurs.

Palp 8-segmented; segment 2 > 4; segments 6, 7, and 8 relatively slender (much longer than wide).

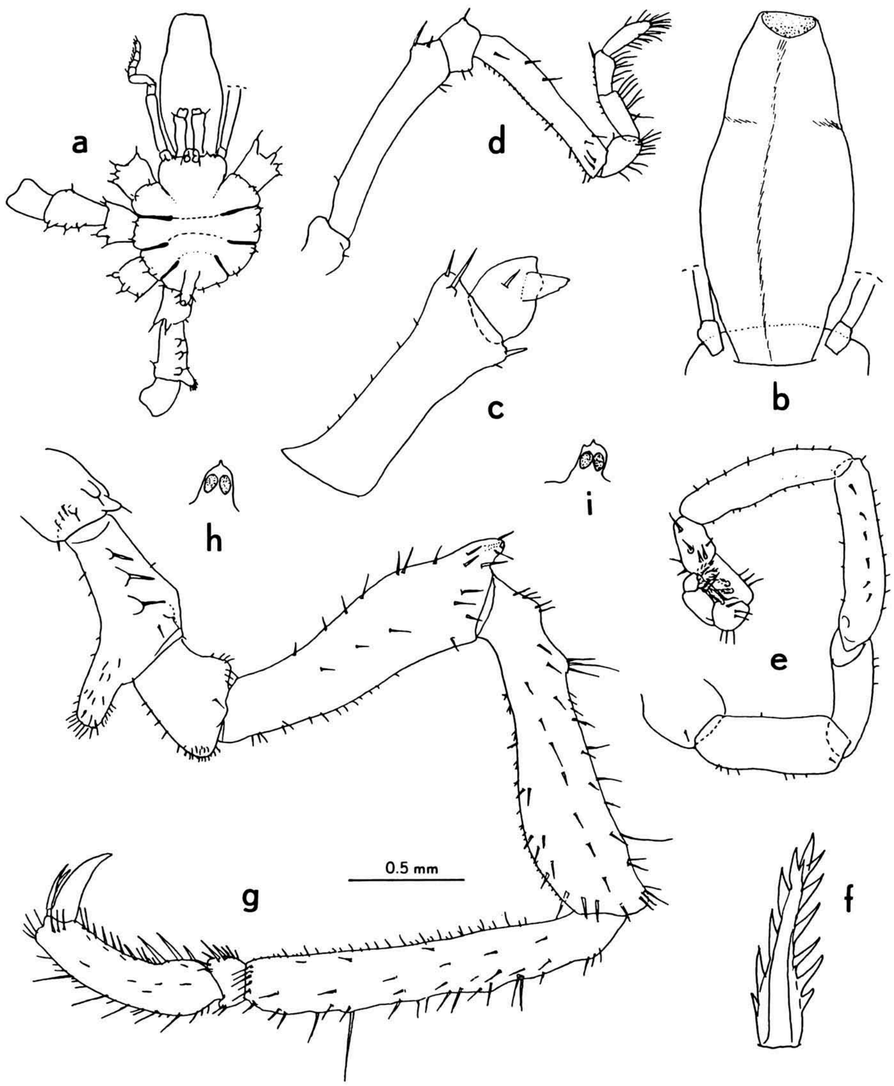



Fig. 5. *Achelia tenuipes* spec. nov., a-g, ♂, holotype; h-i, ♀, allotype, from CANCAP-VII Stn. 7.140. a, trunk, dorsal; b, proboscis, ventral; c, chelifore; d, palp; e, oviger; f, terminal compound oviger spine; g, third leg; h, ocular tubercle, frontal; i, ocular tubercle, from the right. Scale applies to fig. 5g only.

Oviger: Segment 2 > 3; segments 4 and 5 of equal length, segment 4 with row of recurved spines; these spines smaller than in *A. langi*. Segment 6 with basoventral reversed spine. Compound oviger spines on segments 7 to 10 (2: 1: 1: 2), large, lanceolate, with c. 5 lateral teeth.

Legs: Femur and tibiae particularly slender and elongate, without spiniferous tubercles. Coxa 1 with 2 long, spiniferous dorsal spurs, and 0, 1 or 2 smaller spiniferous tubercles. Coxa 2 with 3 posterior and 1 anterior spiniferous tubercles. Genital spur on P3 and P4; distal part strongly spiniferous. Coxa 3 without tubercles. Dorsodistal end of femur produced into rounded-conical process bearing cement gland opening at tip; no produced duct of gland. Propodus with 3 slender heel spines; sole with 8-10 smaller spines. Claw less than half as long as propodus; auxiliary claws slightly over half as long as claw.

Female less spinose than male.

Etymology.—The name *tenuipes* alludes to the slender legs.

Measurements of holotype (those of allotype in parentheses) (in mm).—Length body (frontal margin cephalic segment to tip 4th lateral process) 1.81 (1.77); width across 2nd lateral processes 1.52 (1.48); length proboscis (ventral) 1.81 (2.37); greatest diameter proboscis 0.85 (1.03); length scape 0.37 (0.58). Third leg: 1st coxa 0.46; 2nd coxa 0.73; 3rd coxa 0.46; femur 1.40; 1st tibia 1.60; 2nd tibia 1.73; tarsus 0.11; propodus 0.89; claw 0.43; auxiliary claws 0.27.

## **Achelia echinata** Hodge, 1864

Krapp, 1983: 408; Sanchez & Munilla, 1987: 182; Arnaud, 1988: 38.

Material.—5 spms. CANCAP-IV Stn. 4.152, Canary Islands, SW of Palma, 28°38′N 17°59′W, 180-120 m, old traps with lines, trawl, 3 June 1980 (RMNH).—2 ♀♀, 3 juv. (probably this species). CANCAP-V Stn. 5.029, Azores, E of Santa Maria, 37°00′N 25°02′W, 32 m, stone with brown algae, grab, 28 May 1981 (RMNH).—8 spms. CANCAP-V Stn. 5.088. Azores, E of Faial, 38°31′N 28°36′W, 50-60 m, calcareous stones, dredge. 1 June 1981 (RMNH).—7 spms. CANCAP-V Stn. 5.098, Azores, W. of Pico, 38°33′N 28°32′W, 40 m, volcanic gravel, shell gravel, stone, grab, 2 June 1981 (RMNH).—13 spms. CANCAP-V Stn. 5.116. Azores, N. of São Jorge, 38°38′N 27°55′W, 20 m, cobbles with algae, grab, 4 June 1981 (RMNH).—2 ♀♀, 2 juv. (probably this species). CANCAP-V Stn. 5.117, Azores, off São Jorge, 38°38′N 27°55′W, 40-50 m, cobbles with algae, grab 4 June 1981 (RMNH).—1 ♂, 1 juv. CANCAP-V Stn. 5.142, Azores, W. of Pico, 38°35′N 28°33′W, 108-118 m, *Chama* bed, dredge, 7 June 1981 (RMNH).—1 ♀. CANCAP-V Stn. 5.167, Azores, N. of Flores, 39°31′N 31°11′W, 20-25 m, algae, dredge, 10 June 1981 (RMNH).—1 ♂ ovig. CANCAP-V Stn. 5.D01, Azores, S coast of São Miguel, 37°43′N 25°30′W, 10-20 m, SCUBA diving, sheltered bay, 26 May 1981 (RMNH).

Remarks.—Common in the littoral and shelf zones, from Norway to the Canary Islands. Also abundant in the Mediterranean.

## **Achelia setulosa** (Loman, 1912)

Fage & Stock, 1966: 317-318, fig 1.

Material. — 1 ♀ CANCAP-VI Stn. 6.136, Cape Verde Islands, S of São Vicente, 16°46'N 25°02'W, 57-61 m, sand, bryozoans, calcareous algae, dredge, 19 June 1982 (RMNH).

Remarks. — This female is very spinose, just as illustrated by Bouvier, 1917, Pl.IV fig. 10. The species appears to be endemic to the Cape Verde Islands: it has been recorded from off the islands of Brava, Fogo and São Vicente.

## **Achelia vulgaris** (Costa, 1861)

Bouvier, 1923: 55 (syn.); Stock, 1954a: 100; Gotlieb, 1959: 114; Stock, 1962: 219; de Haro, 1966: 665; Fage & Stock, 1966: 316; Stock, 1966: 408; Ledoyer, 1966a: 162; Ledoyer, 1968: 170; Stock, 1968: 17; Arnaud, 1973: 151; Krapp 1973a: 58; Krapp, 1975: 284; Arnaud, 1976: 71; Munilla, 1978: 8; Munilla, 1981: 80; Krapp, 1983: 408; Sanchez & Munilla, 1987: 182; Arnaud, 1988: 39.

Material. — 1 ♂, 2 ♀♀. CANCAP-II Stn. 2.K15, Canary Islands, SW coast of Hierro, Puerto Orchilla, 27°42'N 18°07'W, littoral/sublittoral (1-7 m), 5 Nov. 1977 (RMNH). — 1 ♂, 1 juv. CANCAP-VII Stn. 7.044, Cape Verde Islands, SW of Maio, Pta. Inglez/Pta. Preta, 15°07'N 23°14'W, 45 m, calcareous nodules, dredge. 25 Aug. 1986 (RMNH). — 1 ♂. CANCAP-VII Stn. 7.047, Cape Verde Islands, SW of Maio, Pta Inglez/Pta. SW of Maio, 15°06'N 23°13'W, 75 m, marl, trawl, 25 Aug. 1986 (ZMA). — 1 ♂ ovig., 2 ♀♀. CANCAP-VII Stn. 7.081, Cape Verde Islands, W. of Boa Vista, W of Ilhéu de Sal-Rei, 16°11'N 23°00'W, 70 m, antipatharians, Porifera, trawl, 28 Aug. 1986 (RMNH). — 2 ♂♂, 1 ♀. CANCAP-VII Stn. 7.107, Cape Verde Islands, W of Sal, off Palmeira, 16°45'N 23°00'W, 70 m, calcareous nodules, 30 Aug. 1988 (ZMA & RMNH). — 1 ♂. CANCAP-VII Stn. 7.111, Cape Verde Islands, W of Sal, off Palmeira, 16°46'N 23°02'W, 90 m, antipatharians, sponges, trawl, 31 Aug. 1986 (RMNH). — 1 ♂. CANCAP-VII Stn. 7.125, Cape Verde Islands, S of Razo, 16°36'N 24°36'W, 85-130 m, calcareous algae, dredge, 1 Sep. 1986 (RMNH). — 8 spms. CANCAP-VII Stn. 7.151, Cape Verde Islands, S of Branco, 16°38'N 24°41'W, 75 m, hard bottom, trawl, 5 Sep. 1986 (RMNH). — 1 ♂, 2 ♀♀. CANCAP-VII Stn. 7.155, SW of Branco, 16°39'N 24°43'W, 75 m, calcareous nodules, dredge, 5 Sep. 1986 (RMNH).

Distribution. — Entire Mediterranean basin, Atlantic coast of Morocco, Canary and Cape Verde Islands.

## **Achelia sawayai** Marcus, 1940

Krapp & Kraeuter, 1976: 342 (refs.); Stock, 1986: 415 (refs.).

Material. — 1 spm. (♀?). CANCAP-VI Stn. 6.161, Cape Verde Islands, NW of São Vicente, 16°54'N 25°02'W, 35-40 m, calcareous algae, bryozoans, trawl, 21 June 1982 (RMNH). — 1 ♀. CANCAP-VI Stn. 6.170, Cape Verde Islands, NW of São Vicente, 16°54'N 25°01'W, 30-37 m,

calcareous algae, shells, trawl, 22 June 1982 (RMNH). — 1 ♀. CANCAP-VI Stn. 6.D07, Cape Verde Islands, SW coast of Santa Luzia, 16°45'N 24°46'W, rocky and sandy coast, SCUBA diving to 10 m, 6 June 1982 (RMNH).

This is an amphiatlantic, tropical species, recorded from the W coasts of Africa, Brazil and the West Indies. It was found in the Cape Verde Islands by Fage & Stock, 1966.

### **Tanystylum brevicaudatum** Fage & Stock, 1966

Fage & Stock, 1966: 319-321, fig. 2; Arnaud, 1971: 162-163, figs. 5-9; Clark, 1977: 321.

Material. — 2 ♀. CANCAP-VII Stn. 7.D14, Cape Verde Islands, Branco, S coast near Ponta de Parede, 16°39'N 24°41'W, sandy bottom, rock ledges, SCUBA diving, 12-15 m, 4/5 Sep. 1986 (RMNH).

Up to now, only female specimens have been recorded. The species was already known from the Cape Verde Islands (Fage & Stock, 1966).

## Family **COLOSSENDEIDAE** Hoek, 1881

### **Colossendeis clavata** Meinert, 1898

Stock, 1978: 399; Stock, 1984: 746.

Material. — 1 spm. CANCAP-II Stn. 2.069, Canary Islands, S of Fuerteventura, Punta del Morro Jable, 27°57'N 14°13'W, 1820 m, trawl, 30 Aug. 1977 (RMNH). — 3 spms. CANCAP-V Stn. 5.004, Azores NE of São Miguel, 38°06'N 24°49'W. 2400-3100 m, deep-sea clay, much pumice, trawl, 24 May 1981 (RMNH).

Previous records are from the northern Atlantic between Iceland and Cape Ortegal (Spain); also on the North American side of the Atlantic. The present two localities form a southward extension of the range to the Canary Islands.

### **Colossendeis colossea** Wilson, 1881

Stock, 1988: 508 (refs.)

Material. — 2 spms. CANCAP-V Stn. 5.016, Azores, S of São Miguel, 37°21'N 25°29'W, 2000-2100 m, deep-sea clay, much pumice, trawl, 26 May 1981 (RMNH). — 1 spm. CANCAP-V Stn. 5.023, Azores, W of Formigas, 37°17'N 25°07'W, 1370-2000 m, clayey bottom, trawl, 27 May 1981 (RMNH). — 1 spm. CANCAP-V Stn. 5.090, Azores, S of Pico, 38°09'N 28°31'W, 1320-1350 m, hard bottom, trawl, 2 June 1981 (RMNH).

A bathyal/abyssal species, distributed in all major oceans.

## **Colossendeis gracilis** Hoek, 1881.
(fig. 6)

Hoek, 1881: 69-70, pl. 9 figs 6-8, pl. 10 figs, 6-7; Stock, 1963: 330, fig. 6a

Material. — 2 spms. "Tyro" Mauritania-II Expedition Stn. MAU.104, off Banc d'Arguin, 19°43'N 17°30'W, 1500 m, trawl, 17 June 1988 (ZMA). — 12 spms. "Tyro" Mauritania-II Expedition Stn. MAU.105, off Banc d'Arguin, 19°43'N 17°44'W, 1600-1900 m, trawl, 17 June 1988 (RMNH).

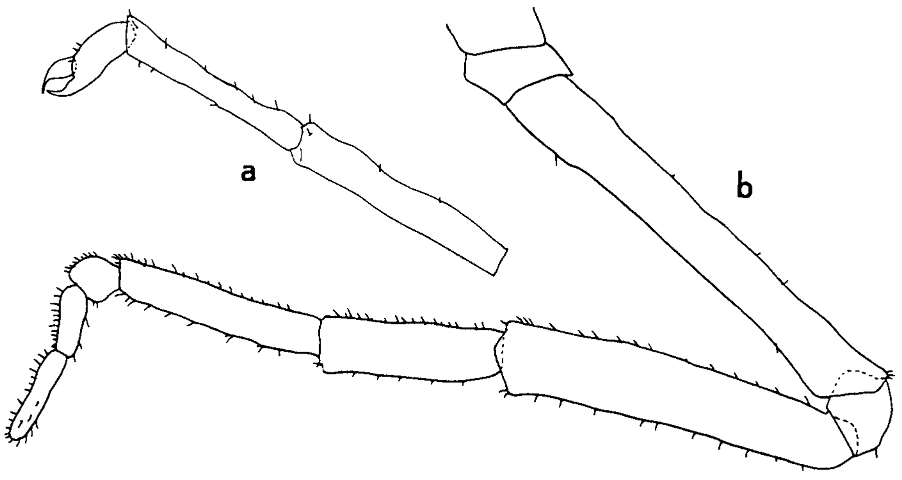



Fig. 6. *Colossendeis gracilis* Hoek, 1881, from "Tyro" MAU-104. a, chelifore; b, palp.

Both specimens from Stn. MAU.104 have retained their chelifores with a two-segmented scape, and gaping, unarmed fingers. It is not unlikely, but unproved, that *C. gracilis* Hoek, 1881, is the juvenile form of *C. angusta* Sars, 1877.

## **Colossendeis macerrima** Wilson, 1881

Stock, 1984: 746.

Material. — 2 spms. CANCAP-III Stn. 3.107, off Western Sahara, 24°17'N 16°49'W, 1000-1100 m, mud, 26 Oct. 1978 (RMNH). — 6 spms. CANCAP-III Stn. 3.108, off Western Sahara, 24°17'N 16°52'W, 1100-1150 m, mud, clay, sponge spicules, trawl, 26 Oct. 1978 (RMNH). — 1 spm. CANCAP-V Stn. 5.023, Azores, W of Formigas, 37°17'N 25°07'W, 1370-2000 m, clayey bottom, trawl, 27 May 1981 (RMNH). — 4 spms. "Tyro" Mauritania-II Expedition Stn. MAU.105, off Banc d'Arguin, 19°43'N 17°44'W, 1600-1900 m, trawl, 17 June 1988 (RMNH).

Recorded from deep waters of all major ocean basins, although possibly a number of sibling species are hiding under the name of *C. macerrima,* in particular when non-North Atlantic material is concerned.

### **Colossendeis minuta** Hoek, 1881

Stock, 1963: 326; Turpaeva, 1975: 241.

Material. — 5 spms. CANCAP-V Stn. 5.016, Azores, S of São Miguel 37°21′N 25°29′W, 2000-2100 m, deep sea clay, much pumice, trawl, 26 May 1981 (RMNH).

A rare species, recorded from deep waters all over the Atlantic Ocean.

## Family **NYMPHONIDAE** Wilson, 1878

### **Nymphon** J.C. Fabricius, 1794

This genus is more abundant in cool waters than in the (sub)tropics. The Atlantic coasts of Africa form a remarkable exception on this rule, no doubt because these coasts are washed by cool currents and are influenced by cool, upwelling waters.

Between Morocco and the Tropic of Capricorn, 14 species are known, listed in table 1.

### **Nymphon adami** Giltay, 1937

Giltay, 1937: 84-87, figs. 2-5; Fage, 1956b: 290-291, fig. 1; Fage, 1959: fig. 1a; Stock, 1967: 47; Stock, 1975: 1001-1004, figs. 18, 19a-d.

Material. — 1 ♂ ovig. "Tyro" Mauritania-II Expedition Stn. MAU.109, off Banc d'Arguin, 20°31′N 17°05′W, 22 m, muddy sand with shell gravel, grab, 18 June 1988 (RMNH).

Remarks. — Another specimen from Mauritania is preserved in the Museum "Gr. Antipa", Bucarest (unpubl. record). These are the two northernmost records for this species. It ranges southward to Nigeria.

### **Nymphon caementarum** Stock, 1975
(fig. 7)

Stock, 1975: 1004-1006, figs. 19e-g, 20.

Table 1. Species of *Nymphon* known from the Atlantic coast of Africa from Morocco to the Tropic of Capricorn and from depths of 0 to about 350 m.

A. Uniunguiculate species

1. *caementarum* Stock, 1975; Ivory Coast, Liberia (Stock, 1975); Mauritania (present paper).
2. *caldarium* Stock, 1988: NW Morocco (Stock, 1988).
3. *calypso* Fage, 1959: Senegalese/Gambian border (Fage, 1959); Sierra Leone, Gambia (Stock, 1967).
4. *cognatum* Loman, 1928: Morocco (Loman, 1928).
5. *longituberculatum* Olsen, 1913: off Western Sahara (Olsen, 1913).
6. *mauritanicum* Fage, 1942: Mauritania, Western Sahara (Fage, 1942).
7. *nugax* Stock, 1967: Senegal (Stock, 1967).
8. *prolatum* Fage, 1942: Senegal (Fage, 1942; Stock, 1967).

B. Species with auxiliary claws

9. *adami* Giltay, 1937: Mauritania (present paper); Senegal (Giltay, 1937; Stock, 1967); Sierra Leone (Fage, 1956); Ivory Coast (Fage, 1959; Stock, 1975); Nigeria (Stock, 1975).
10. *angolense* Gordon, 1932: Angola (Gordon, 1932).
11. *curvidens* n. sp.: Mauritania (present paper).
12. *gracile* Leach, 1814: Morocco (Lomon, 1925; present paper); Rio de Oro (Sahara) (Loman, 1925).
13. *gruveli* Bouvier, 1910: Morocco (Loman, 1928, 1930); Rio de Oro (Sahara) (Giltay, 1937; Fage, 1942, 1959; Stock, 1951); Mauritania (Bouvier, 1910; present paper); Senegal (Fage, 1942; Stock, 1967); Gambia (Stock, 1967).
14. *foresti* Fage, 1953: Guinée Conakry (Fage, 1953).

Material. — 1 ♀. "Tyro" Mauritania-II Expedition Stn. MAU.020, off Mauritania, 18°50'N 16°24'W, 37 m, sandy bottom trawl, 8 June 1988 (RMNH). — 1 ♂. "Tyro" Mauritania-II Expedition Stn. MAU.022, off Mauritania, 18°50'N 16°28'W, 60-66 m, muddy sand, trawl, 8 June 1988 (RMNH).

These specimens have a somewhat shorter coxa 2 than the original material (from the Ivory Coast and Liberia), especially in the female (fig. 7a) but the distribution of the cement glands as well as the other characteristics agree with *N. caementarum*. The female of this species was not recorded before. Its oviger is illustrated in fig. 7b; the oviger spine formula of the ♀ is 8: 6: 5: 5:: 7; the immovable finger of the chela bears 24 theeth, the movable finger 21.

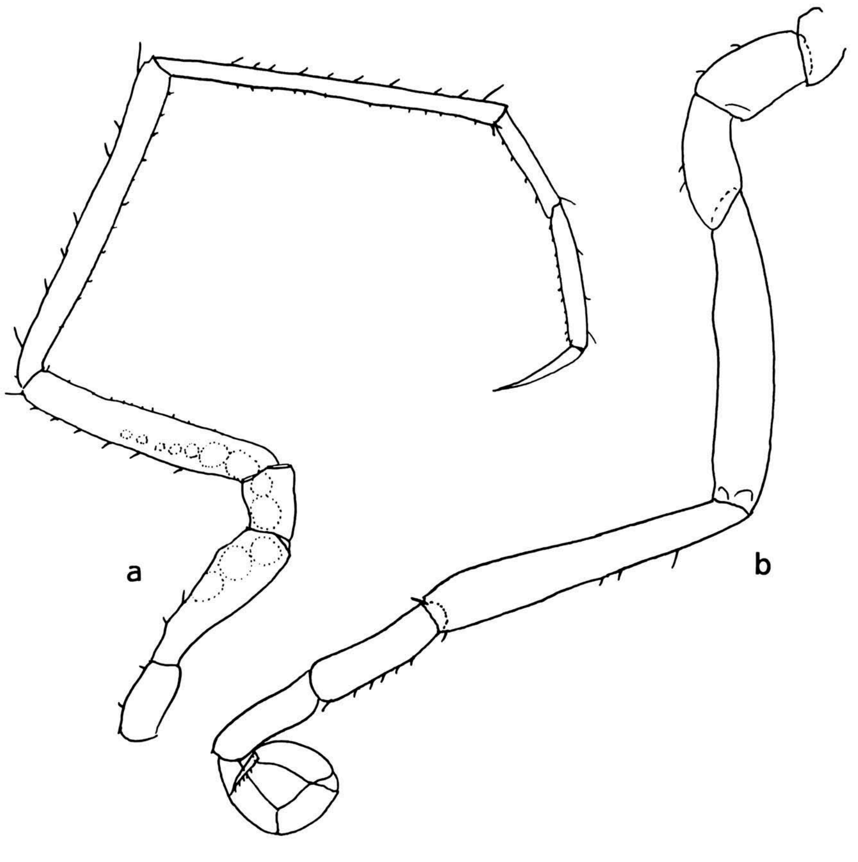



Fig. 7. *Nymphon caementarum* Stock, 1975, ♀, from "Tyro" MAU-020. a, third leg; b, oviger.

## **Nymphon curvidens** spec. nov.
(figs. 8, 9)

Material. — 1 ♂ ovigerous (holotype). "Tyro" Mauritania-II Expedition Stn. MAU.122, off Banc d'Arguin. 20°27'N 17°15'W, 32 m shell gravel and bivalve shells, on *Pyura*, 19 June 1988 (ZMA).

Description of holotype. — Body without spines, setae or tubercles. Neck moderately elongate, diameter crop more than twice that of neck. Cephalic segment shorter than body segments 2 to 4 combined. Oviger implantation just separate from first lateral process. Ocular tubercle almost cylindrical, apically

with 2 tubercles. Eyes not very large, well-pigmented. Lateral processes more than twice as long as wide, separated by distance greater than own diameter. Abdomen turned upward at angle of about 45°, shorter than 4th lateral process.

Proboscis cylindrical.

Chelifore scapes strongly diverging, shorter than chela. Palm of chela shorter than fingers. Movable finger with 15 strong, slightly curved teeth; length of teeth somewhat irregular. Immovable finger with 19 teeth; most teeth crooked, some smaller teeth straight; crooked teeth often with some tubercles.

Palp segment 2 longest, segm. 3 about 75% of length of segm. 2; segm. 4 < segm. 5, 4 + 5 together longer than 3.

Oviger segment 5 somewhat longer than 4, with distal lobe provided with row of setae. Compound spine formula 11: 10: 6: 8; compound spines with 2 to 4 marginal teeth. Claw straight, with 7 teeth. Eggs very numerous, small (diameter 95-124 μm), in irregular bundles (not in balls).

Legs slender, poorly setose/spinose. Coxa 2 shorter than coxae 1 + 3 combined. Femur shorter than tibia 1 or 2. Cement gland pores minute, hard to discern, probably about 40 in number (on leg 3). Tibiae 1 and 2 subequal; ventrodistal end of tibia 2 with heavy spine, dorsodistal end with one low tubercle. Tarsus slightly shorter than propodus; ventral margin armed with numerous minute spinules. Claw half as long as propodus. Auxiliary claws less than ¼ of main claw.

Measurements (mm) — Length cephalic segment 1.56; length trunk segment II 0.38; length trunk segment III 0.45; length trunk segment IV (to tip 4th lateral process) 0.83; width across 2nd lateral processes 2.16; length proboscis (dorsal) 0.77; greatest diameter proboscis 0.45; length scape 0.74; length chela 1.22; first to fifth palp segments 0.25, 0.79, 0.57, 0.30, 0.54. Third leg: 1st coxa 0.70; 2nd coxa 1.32; 3rd coxa 0.64; femur 2.54; 1st tibia 3.43; 2nd 3.47; tarsus 1.55; propodus 1.68; claw 0.81; auxiliary claws 0.18.

Remarks. — Within the group of West African species provided with auxiliary claws, the new species is very similar to *N. gruveli* and *N. adami*. All other species have longer spines on the propodus and longer auxiliary claws. (*N. foresti* approaches the new species slightly more, but has a much longer tibia 2, palp segments 4 and 5 of equal length, and 45 teeth on the immovable finger of the chela.)

*N. adami* (for additional figures see Stock, 1975) has a more slender neck, shorter auxiliary claws (1/7 of main claw), longer claws (usually 2/3 to 5/6 of propodus), and straight teeth on the immovable finger (not crooked).

*N. gruveli* is frequently recorded from the African coast, but no new illustrations have been published, with the exception of Giltay's figure of the male

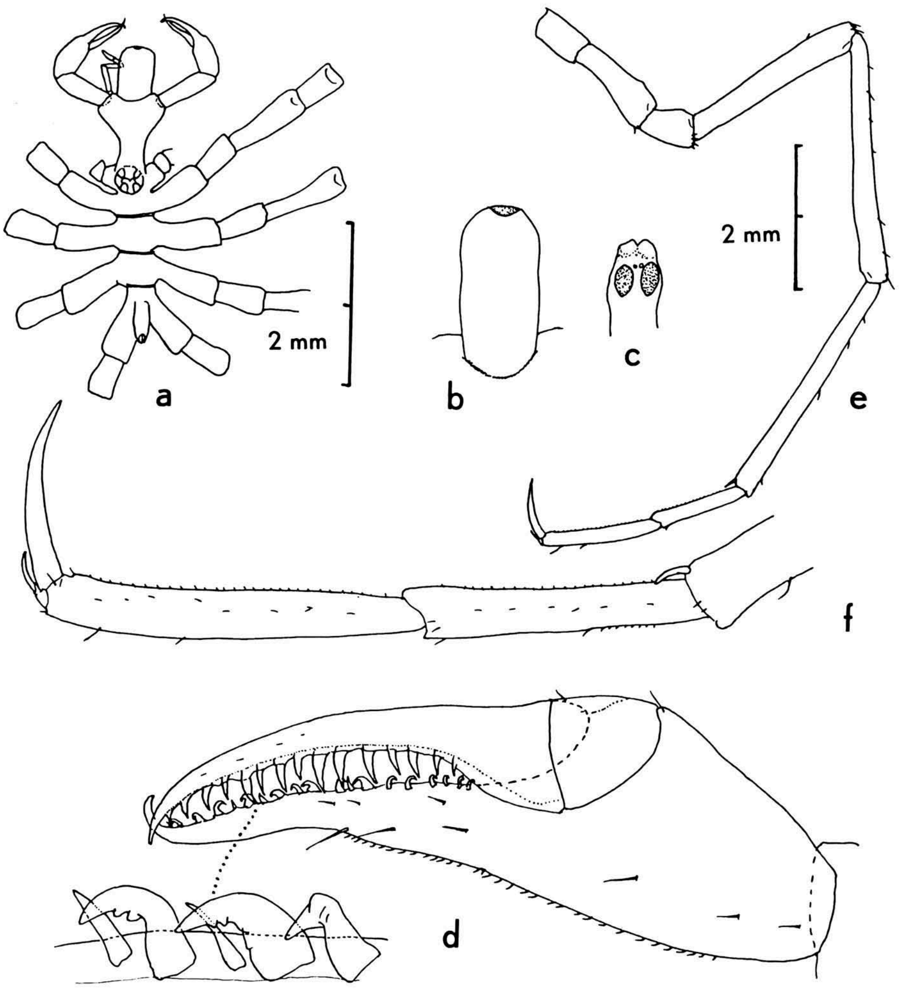



Fig. 8. *Nymphon curvidens* spec. nov., ♂, holotype, from "Tyro" MAU-122. a, trunk, dorsal; b, proboscis, ventral; c, ocular tubercle, frontal; d, chela (teeth of immovable finger more strongly enlarged); e, third leg; f, distal segments of third leg. Left scale applies to fig. 8a, right scale to fig. 8e.

oviger. Comparision of the new species with the material of *N. gruveli* in the present collections, revealed the following differences: The immovable finger of the chela of *gruveli* (fig. 8a) bears 38 straight teeth (versus 19 crooked teeth in the new species), the movable finger has 42 teeth (versus 15) of much smaller size. The compound oviger spines (fig. 8b), 13: 11: 11: 9 in number in *gruveli*,

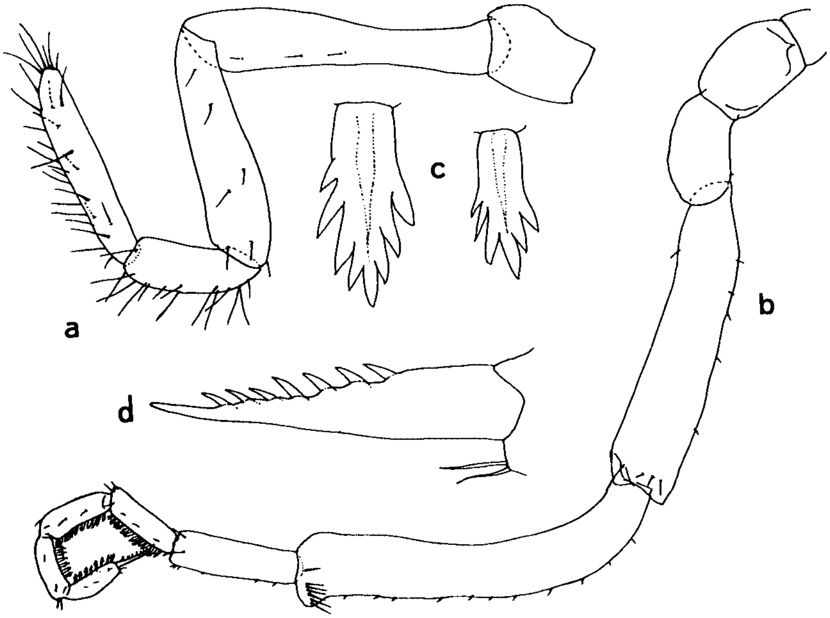



Fig. 9. *Nymphon curvidens* spec. nov., ♂, holotype, from "Tyro" MAU-122. a, palp; b, oviger; c, different compound oviger spines; d, terminal oviger claw.

bear more marginal teeth (6, versus 2-4). The terminal oviger claw bears 12 teeth (versus 7). Finally, *N. gruveli* is much larger than the new species.

Etymology. — The specific epithet *curvidens* alludes to the crooked teeth on the immovable finger of the chela.

## **Nymphon gracile** Leach, 1814

Arnaud, 1988: 53.

Material. — 1 spm. Morocco, 1 km S of Oued Yquem (= 22 km S. of Rabat), depth 0-0.2 m, 20 Oct. 1974 (RMNH).

This shallow-water species is distributed along the Atlantic coasts of southern Europe (North to the Straits of Dover), the Mediterranean, and the Atlantic coast of NW Africa. Loman (1925) has recorded it from Morocco (Plage de Mogador) and Rio de Oro.

## **Nymphon gruveli** Bouvier, 1910.
(fig. 10)

Bouvier, 1910: 332-335, pl. LXIV; Loman, 1928: 61; Loman, 1930: 71; Giltay, 1937: 83-84, fig. 1; Fage, 1942: 76-77; Stock, 1951: 8; Fage, 1959: 236; Stock, 1966: 46-47.

Material. — 4 spms. CANCAP-III Stn. 3.122, off Mauritania, 20°21'N 17°39'W, 100-150 m, muddy sand, trawl, 28 Oct. 1978 (RMNH). — 5 spms. CANCAP-III Stn. 3.158, off Mauritania, 19°22'N 16°51'W, 85 m, hard bottom, sponges, brown algae, trawl, 31 Oct. 1978 (RMNH). — 21 spms. CANCAP-III Stn. 3.162, off Mauritania, 19°25'N 16°50'W, 80 m, muddy sand, trawl, 31 Oct. 1978 (RMNH). — 14 spms. CANCAP-III Stn. 3.163, off Mauritania, 19°25'N 16°50'W, 95 m, muddy sand, shells, worm tubes, trawl, 31 Oct. 1978 (RMNH). — 1 spm. "Tyro" Mauritania-II Expedition Stn. MAU.027, off Mauritania, 18°50'N 16°18'W, 16 m, hard bottom with sand, hydroids, soft corals, trawl, 9 June 1988 (RMNH). — 5 spms. "Tyro" Mauritania-II Expedition Stn. MAU.072, off Banc d'Arguin, 20°00'N 17°24'W, 48-52 m, muddy sand with some calcareous gravel, trawl, 13 June 1988 (ZMA). — 1 spm. "Tyro" Mauritania-II Expedition Stn. MAU.082, off Banc d'Arguin, 19°59'N 17°30'W, 100 m, trawl, 14 June 1988 (ZMA). — 27 spms. "Tyro" Mauritania-II Expedition Stn. MAU.101, off Banc d'Arguin, 19°43'N 16°59'W, 61-78 m, sticky grey mud with some sand and shell gravel, trawl, 16 June 1988 (7 ZMA, 20 RMNH). — 3 spms. "Tyro" Mauritania-II Expedition Stn. MAU.124, off Banc d'Arguin, 20°26'N 17°21'W, 37 m, muddy sand and shell gravel, trawl, 19 June 1988 (RMNH). — 1 spm. "Tyro" Mauritania-II Expedition Stn. MAU.126, off Banc d'Arguin, 20°24'N 17°30'W, 55-60 m, fine sediment, trawl, 19 June 1988 (ZMA). — 6 spms. "Tyro" Mauritania-II Expedition Stn. MAU.130, off Banc d'Arguin, 20°25'N 17°40'W, 95-100 m, muddy sand, trawl, 20 June 1988 (4 ZMA, 2 RMNH).

This species is rather similar to *N. curvidens*, but has straight teeth on the fingers of the chela, more than one dorsodistal tibial tubercle, and is much larger. This is one of the most common *Nymphon* species in NW Africa, recorded from Morocco to Senegal.

## Family **CALLIPALLENIDAE** Hilton, 1942

### **Callipallene producta** (Sars, 1888)

Stock, 1952: 6, figs. 9-11; Stock, 1978: 215; Stock, 1988: 513; Sanchez & Munilla, 1987: 182; Sanchez & Munilla, in press.

Material. — 1 ♀. CANCAP-VII Stn. 7.107, Cape Verde Islands, W of Sal, off Palmeira, 16°45'N 23°00'W, 70 m, calcareous nodules, trawl, 30 Aug. 1986 (RMNH).

Widely distributed in the NE Atlantic, from Norway to the Canary Islands. The Cape Verde record constitutes the most southern locality known so far.

### **Callipallene tiberi** (Dohrn, 1881)

Stock, 1988: 513 (refs.); Arnaud, 1988: 50.

Material. — 1 ♂. CANCAP-IV Stn. 4.D12, Canary Islands, W coast of La Palma, Punta del Moro, 28°38'N 17°56'W, SCUBA diving, 0-15 m, rocky and sandy coast, 2 June 1980 (RMNH).

Although Arnaud (1988) considers this species synonymous with *C. emaciata* (Dohrn, 1881), I feel that the pronounced angular shape of the proboscis of

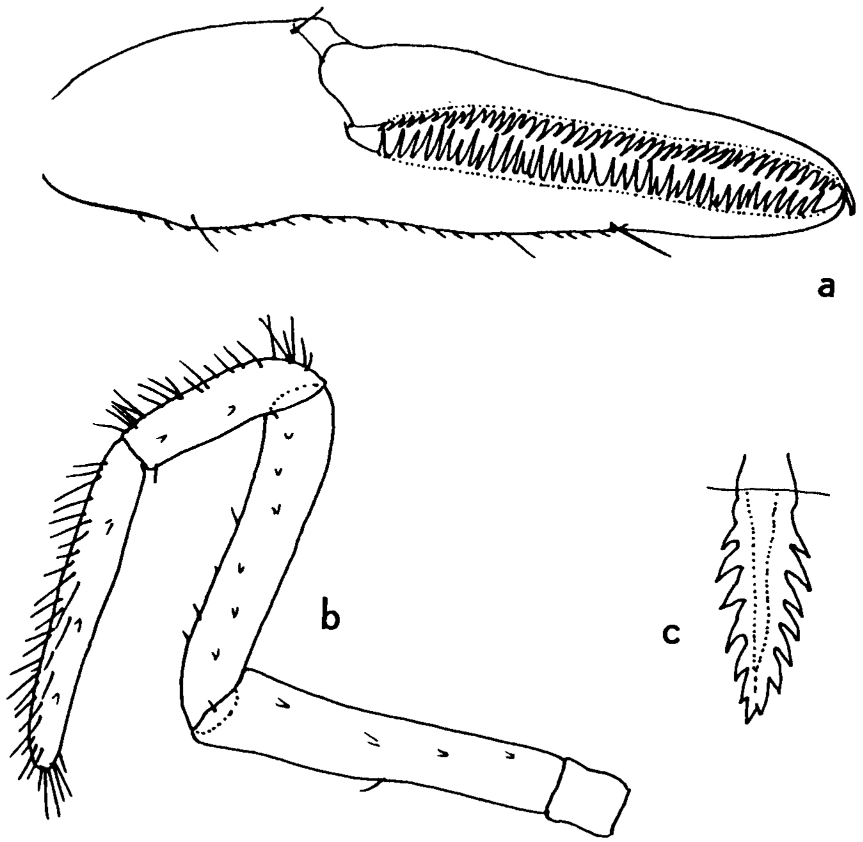



Fig. 10. *Nymphon gruveli* Bouvier, 1910, ♂, from "Tyro" MAU-072. a, chela; b, palp; c, compound oviger spine.

*C. tiberi* forms an easily discernible difference between the two species. *C. tiberi* is new to the Canary Islands; it was previously recorded from the western Mediterranean, Portugal, and the Atlantic coasts of Europe, as far north as the Straits of Dover.

## **Pallenopsis (Bathypallenopsis)** spec.

Material. — 1 ♀. CANCAP-V Stn 5.001, Azores, NE of São Miguel, 30°10'N 24°52'W, 2950-3150 m, deep-sea clay, much pumice, trawl, 23 May 1981 (RMNH).

The female is in a flabby state and is presumably not adult. By the shape of

its proboscis, it belongs to the *mollissima*-group (see Stock, 1975: 1032). In the morphology of the oviger, the specimen corresponds best with *P. (B). mollissima atlantica* Stock, 1986. However, it differs from the ssp. *atlantica* in a somewhat more slender chela (the fingers being finely denticulated, as in ♂ *atlantica)* and a more slender propodus.

## Family **PHOXICHILIDIIDAE** Sars, 1891

### **Anoplodactylus angulatus** (Dohrn, 1881)

*Phoxichilidium angulatum* Dohrn, 1881: 184-188, pl. XII figs. 1-12 (= *Ph. angulirostre* Dohrn, 1881: 34, 35, 68, *lapsus calami).*

Material. — 1 ♂ juv. CANCAP-IV Stn. 4.D12, Canary Islands, W coast of La Palma, Punta del Moro, 28°38'N 17°56'W, SCUBA diving, 0-15 m, rocky and sandy coast, 2 June 1980 (RMNH). — 1 ♀. CANCAP-V Stn. 5.116, Azores, N of São Jorge, 38°38'N 27°55'W, 20 m, cobbles with algae, grab, 4 June 1981 (RMNH).

Remarks. — This species is known from the entire Mediterranean (although it is more frequently recorded from its western part), Ireland and Wales (Crothers, 1966; King, 1969; King *et al.*, 1971; Ryland, 1976; Roberts, 1981), Portugal (Saldanha, 1974), the Azores (Arnaud, 1974), and the Canary Islands (Sanchez & Munilla, in press).

### **Anoplodactylus maritimus** Hodgson, 1914

Refs.: Child, 1982: 371.
Syn.: *A parvus* Giltay, 1934 (see Stock, 1975: 1073).

Material. — 1 ♀, probably this species. CANCAP-I Stn. 1.D80, S coast of Madeira near Ponta da Atalaia, 32°39'N 16°49'W, 0-22 m, 15 March 1976 (RMNH). — 50 spms (incl. many ovigerous males). CANCAP-IV Stn. 4.152, Canary Islands, SW of La Palma, 28°38'N 17°59'W, 180-120 m, old fish trap with lines, trawl, 3 June 1980 (RMNH). — 1 ♂ juv. CANCAP-IV Stn. 4.DO3, Canary Islands, SE coast of Lanzarote, Arrecife, 28°57'N 13°33'W, SCUBA diving, to 15 m, rocky and sandy coast, 20-21 May 1980 (RMNH).

Remarks. — The species was originally described from floating *Sargassum* south of the Azores, but was later found to be widely distributed from Virginia (U.S.A.), south through the West Indies to Brazil, and in the eastern Atlantic from the Azores to the Cape Verde Islands.

### **Anoplodactylus pygmaeus** (Hodge, 1864)

Krapp, 1983: 412 (refs.); Arnaud, 1988: 46.

Material. — 1 ♀. CANCAP-IV Stn. 4.K03, Canary Islands, N coast of Gran Canaria, Las Palmas, 29°09'N 15°26'W, rocky shore with tide pools, shore collecting, washed from algae, 2 May 1980 (RMNH). — 1 ♀. CANCAP-V Stn. 5.116, Azores, N of São Jorge, 38°38'N 27°55'W, 20 m, cobbles with algae, grab, 4 June 1981 (RMNH).

Remarks. — Although this species is a regular member of the fauna of photophilous algae, it is sometimes recorded from below the photic zone, down to 537 m (Arnaud, 1988). It has been found on temperate European Atlantic coasts (as far north as Sweden), the Mediterranean, the American East coast, and only once on the West African coast (near Agadir, Morocco: Krapp, 1983).

### **Anoplodactylus** spec. (cf. **massiliensis** Bouvier, 1916)

Stock, 1966: 52-53, fig. 3a-b (refs.); Stock, 1970: 8, figs. 14-17; Sanchez & Munilla, 1987: 182; Arnaud, 1988: 45 (refs., syn.).

Material. — 1 juv. CANCAP-I Stn. 1.085, near S. coast of Madeira, 32°38'N 16°51'W, 150 m, coarse sand and shells, grab, 15 March 1976 (RMNH).

Remarks. — Recorded from the western Mediterranean, and the NW coast of Africa, south to Tenerife.

### **Endeis charybdaea** (Dohrn, 1881)

Stock & Soyer, 1965: 417, fig. 1A-B; Krapp, 1975: 85-94, fig. 1; Arnaud, 1988: 52.

Material. — 1 ♀, presumably this species. CANCAP-IV Stn. 4.070, Canary Islands, SE of Lanzarote, 28°56'N 13°33'W, 41-50 m, sand with clay, algae, dredge, 20 May 1980 (RMNH). — 1 ♂, 1 ♀. CANCAP-VI Stn. 6.109, Cape Verde Islands, S of Santa Luzia, 16°44'N 24°46'W, 55-80 m, calcareous algae, trawl, 16 June 1982 (RMNH). — 1 ♂. CANCAP-VI Stn. 6.163, Cape Verde Islands, NW of São Vicente, 16°54'N 25°01'W, 45-50 m, Foraminifera sand, calcareous algae, trawl, 21 June 1982 (RMNH). — 1 ♂, 2 ♀♀. CANCAP-VII Stn. 7.107, Cape Verde Islands, W of Sal, off Palmeira, 16°45'N 23°00'W, 70 m, calcareous nodules, trawl, 30 Aug. 1986 (RMNH).

Remarks. — The species is known from the Mediterranean and the western North Atlantic (from Stavanger in southern Norway to the Cape Verde Islands) (Krapp, 1975).

The specimens from CANCAP Stn. 6.109 agree better with *E. charybdaea*

than with *E. spinosa,* although the number of cement gland pores on the femur of leg 3 is exceptionally low, *viz.* 19. The male from Stn. 6.163 has 23 gland pores on leg 3, and thus falls within the range typical of *E. charybdaea.* Females in this genus are not readily identifiable.

### **Endeis meridionalis** (Böhm, 1879)

Stock, 1970, fig. 1m; Stock, 1979: 27-28 (refs.); Stock, 1982: 189; Daniel & Sen, 1980: 165.

Material. — 1 ♂, CANCAP-VII Stn. 7.111, Cape Verde Islands, W of Ilha do Sal, off Palmeira, 16°46'N 23°02'W, 90 m, Antipatharia, sponges, trawl, 31 Aug. 1986 (RMNH). — 1 ♂ juv., probably this species. CANCAP-VII Stn. 7.115, Cape Verde Islands, S of Razo, 16°36'N 24°36'W, 80 m, calcareous sand, gravel, nodules, Foraminifera, grab, 1 Sep. 1986 (RMNH).

Remarks. — The male from Stn. 7.111 possesses 22 cement gland pores on leg 3. The species is known from the Indian and western Pacific Oceans, and from Curaçao in the Caribbean; it is new to the West African coast.

### **Endeis straughami** Clark, 1970

*E. straughami* Clark, 1970: 13-15, figs. 1-8; Staples, 1982: 461-462, fig. 5K-M, Pl.1 fig. A-B.
*E. picta* Bamber, 1979: 251-254, fig. 1.
*?Phoxichilus charybdaeus;* Haswell, 1884: 1033 (non Dohrn, 1881)

Material. — 1♂. CANCAP-V Stn. 5.D01, Azores, coast of São Miguel, 37°43'N 25°30'W, SCUBA diving, 10-20 m, sheltered bay, 26 May 1981 (RMNH).

Remarks. — The male recorded above has oviger segment 5 distinctly longer than 4, and possesses spiniform tubercles on the lateral processes. In these respects, it agrees better with *E. straughami* than with *E. biseriata* Stock, 1968. *E. straughami* is known from Queensland (Clark, 1970; Staples, 1982) and Ghana (Bamber, 1979).

## Family **PYCNOGONIDAE** Wilson, 1878

### **Pycnogonum (Retroviger) cessaci** Bouvier, 1911

Stock, 1975: 1085, fig. 58d (refs., syn.); Child, 1979: 72 (refs.)

Material. — 1 ♂. CANCAP-VI Stn. 6.D07, Cape Verde Islands, SW coast of Ilha de Santa Luzia, 16°45'N 24°46'W, rocky and sandy coast, SCUBA diving to 10 m, 16 June 1982 (RMNH).

Remarks. — Known from the tropical coasts of Africa (Bouvier, 1911; Fage, 1952), Brazil, the Antilles, the SE coast of the USA (North Carolina), and the Pacific coast of Panamá. It was recorded before from the Cape Verde Islands (Bouvier, 1911).

### **Pycnogonum (Retroviger) pusillum** Dohrn, 1881

Krapp, 1983: 413 (refs.)

Material. — 1 ♀. CANCAP-VII Stn. 7.140, Cape Verde Islands, S of Razo, 16°35'N 24°36'W, 1200 m, on old lobster pot with about 500 m of nylon rope, dredge, 4 Sep. 1986 (RMNH).

Remarks. — Previously recorded from the western Mediterranean (see Arnaud, 1988), Adriatic Sea (Hoenigman & Stock, 1955; Riedl, 1966; Arnaud, 1988), Morocco (Krapp, 1983), Angola (Stock, 1952), and False Bay, Republic of South Africa (Barnard, 1954). It is new to the Cape Verde Islands. The species is characteristic for shallow-water associations with photophilous algae (Arnaud, 1988). Its occurrence in 1200 m is puzzling, therefore, unless the lobster pot on which it was found came from much shallower waters. The specimen was collected from the drifting rope overgrown with coelenterates (no algae), so the exact depth is unknown.

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